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Q45

With reference to agriculture in India, how can the technique of 'genome sequencing', often seen in the news, be used in the immediate future? 1. Genome sequencing can be used to identify genetic markers for disease resistance and drought tolerance in various crop plants. 2. This technique helps in reducing the time required to develop new varieties of crop plants. 3. It can be used to decipher the host-pathogen relationships in crops. Select the correct answer using the code given below: (a) 1 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3 Official key: D.

UPSC Civil Services Prelims 2017 · General Studies · 2 marks · Art and Culture

Indian art, architecture, culture - Prelims GS Paper I.

Explanation**(a)**

(a) 1 only. Marker identification is a real use, but faster breeding and host-pathogen work are also immediate applications. 1 only is incomplete.

(b)

(b) 2 and 3 only. Statement 1 is equally valid. Not the key.

(c)

(c) 1 and 3 only. Time-saving in variety development is also claimed for sequence-based breeding. Not the key.

(d) Official key

(d) 1, 2 and 3. Genome sequencing can find resistance and drought markers, shorten breeding cycles by informing selection, and map how pathogens interact with crop hosts. All three are accepted near-term uses. This is the official key.

Summary

Official key is (d) 1, 2 and 3. Reading a crop's genome locates markers for disease resistance and drought tolerance so breeders can select without waiting for every field season. That marker-assisted and genomic selection shortens the time to a new variety. Sequence data also clarify host-pathogen molecular relationships. ICAR and the rice/wheat genomes are neighbouring Indian facts. All three statements stand.

Related possible facts

These can be asked in a future Prelims paper.

MAS

Marker-assisted selection

Rice genome

Published 2000s; IRGSP

CRISPR

Neighbour: gene editing, not the same as sequencing

ICAR

Indian agricultural research umbrella

NBPGR

Plant genetic resources, Delhi

Pathogen effectors

Host-pathogen molecular talk

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